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ABSTRACT

The study, with 52 preservice special education teachers, focused on effects of two types of teacher manual design and two levels of material complexity on comprehension of instructional materials utilization. Two materials were selected from an instructional materials collection for less complex material and for more complex material, respectively. Professionally prepared teacher manuals for the materials were redesigned resulting in two versions of each, so that one version was illustrated, and incorporated such features as double spacing, indented paragrapns, and discrete sections, whereas the other was unillustrated, single spaced and had no indentations. The 52 teachers, in two groups, examined the materials and the two versions of the teacher manuals, and completed a comprehension questionnaire containing 16 and 18 items, respectively. Results indicated that superficial teacher guide characteristics aimed at enhancing readability were not a factor in conveying information to the users, and that the structural characteristic of complexity influenced the teachers' comprehension, as they achieved higher comprehension scores for the complex material. One conclusion drawn is that research on generic characteristics of instructional materials should be considered in conjunction with the more commonly conducted materials' evaluation studies. (For related material, see EC 052 344). (MC)

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ACQUISITION OF INSTRUCTIONAL MATERIAL INFORMATION AS A FUNCTION OF MANUAL DESIGN AND MATERIAL COMPLEXITY[1]

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Acquisition of Instructional Material Information As A Function of Manual Design and Material Complexity[1]

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Introduction

One by-product of the increased funding to education witnessed during the previous decade has been a substantial proliferation in the development of instructional materials. The advent and growth of the national network of Special Education Instructional Material Centers (Aserlind, 1970) has suddenly brought this plethora of educational resources within grasp of the special classroom teacher, compounding the everpresent difficulty in materials selection.

Commercial publishers have remained autonomous in materials production with relatively little systematic research into the various parameters of materials consumption. The available research in this area has typically been evaluative in nature, concentrating on the effectiveness of specific materials in meeting educational objectives (e.g. Talkington & Hall, 1970, Brown & Arkebauer, 1970). This approach,

while certainly of high priority, may not in itself be an adequate response to the dire need for materials evaluation. It should be implicitly obvious that successful utilization of any given instructional material is determined by a complex interaction of objectively specifiable as well as less clearly definable subjective variables. Further, it has been acknowledged (Moss, 1968) that successful employment of a particular material will vary as a function of individual teacher, pupil, and environmental characteristics.

Given these circumstances, two approaches are suggested to surmount the difficulties inherent in research on instructional materials. First, an ongoing program of research aimed at the evaluation of individual materials under specified educational environments, with a variety of discrete pupil populations, and a delineable range of teacher competencies and experiences. Direct implementation of this approach would require an inestimable number of studies being unparsimonious, if not unfeasible, in terms of cost, manpower, and available facilities. A model for the empirical evaluation of instructional materials worthy of considerable attention has been proposed by McIntyre and Nelson (1969) seemingly capable of circumventing the unrealistic nature of this approach.

An alternative approach is to study those components of the teacher-pupil-environment triad bearing on the use of instructional materials which may be generalized to a large segment of the available educational resources. The present investigation is one in a series designed to explore the more generic characteristics of instructional

materials, including consumer reactions to various aspects of published materials. This study focused upon the effects of two types of teacher manual design and two levels of material complexity on comprehension of instructional materials' utilization by fifty-two teachers-in-training.

Procedure

All subjects were undergraduate special education majors who were currently enrolled in or who had just completed the introductory teacher-training course sequence at the University of Texas at Austin.

The two instructional materials were selected from the collection at the University of Texas Special Education Instructional Materials Center (UTSEIMC). One item was selected as a less complex material in that the authors, with the assistance of a UTSEIMC curriculum specialist[2], judged its intended objectives and procedures to be obvious from cursory examination. Similarly, the second material was chosen as the more complex by virtue of its demanding a more thorough examination prior to use.

The professionally prepared teacher's manuals accompanying these materials were redesigned resulting in two versions of each. The following characteristics differentiated the two types of experimental manuals. Form A was illustrated, typed double-spaced, employed indented paragraphs and clearly differentiated sections, and utilized upper-case type to accentuate section headings. In contrast, Form B was unillustrated, single-spaced, did not make use of indented paragraphs or discrete sections,

and was uniformly printed in lower-case type. The substantive content of the original guides was maintained in both versions of the redesigned manuals, thus holding constant the actual information available to subjects. The comprehension questionnaires employed with the simple and complex materials contained 16 and 18 items respectively and both were composed of sentence completion items.[3]

The fifty-two teachers-in-training were randomly divided into two groups, one of which examined materials accompanied by Form A of the teacher's manual, while the other examined the same materials accompanied by the Form B manuals. All Ss examined both the simple and the complex material with order of presentation randomly counterbalanced such that 13 Ss in each group reviewed the simple material prior to the complex material while the other 13 Ss in each group examined the complex material prior to the simple material.

Except for these specified treatment variations, the experimental procedure was identical for all Ss. Subjects arrived individually at a distraction-free room according to a pre-determined schedule. The experimenter briefly reported that he was conducting research on instructional materials and provided S with the first of the two materials explaining that it was to be examined for a 5 minute period. Following S's inspection of the material, he was asked to complete the comprehension questionnaire. This same procedure was repeated with the second material.

Results

Percentage of correct responses to each questionnaire served as the dependent measure for statistical analysis. These scores were subjected to an arcsin transformation yielding data amenable to analysis of variance (Winer, 1962). A 2 x 2 mixed analysis of variance was performed with type of manual as the between subjects variable and material complexity as the within subjects variable. Table I summarizes the

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Insert Table I about here

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results of this analysis.

It can be observed from this Table that while manual design was not significant ($F = 2.11$, 1 df, $p > .05$) in effecting Ss' responses to the comprehension questionnaire, level of material complexity was significant ($F = 20.4$, 1 df, $p < .01$) in determining the amount of information acquired by Ss. The mean transformed comprehension scores obtained were 32.09 for the simple material and 36.98 for the complex material. Thus, the significant F ratio would indicate that Ss acquired significantly more information about the complex material than the simple material. The interaction between manual design and material complexity was not significant ($F = 1.44$, 1 df, $p > .05$).

Discussion

The non-significant F-Ratio obtained for type of manual design suggests that superficial teacher guide characteristics, ostensibly aimed at enhancing readability were not consequential in conveying information to the user. This finding should bolster our confidence in the teacher's ability to objectively explore, evaluate, and make educationally relevant decisions regarding instructional materials.

At the same time, Ss' interaction with the instructional materials was apparently not free of all subjective influences. The structural characteristic of material complexity was found to appreciably influence subjects comprehension of the instructional materials with the significantly higher comprehension scores achieved by Ss on the questionnaire accompanying the complex material. To account for this finding, it is proposed that the complex material elicited greater interest and/or attention resulting in a more scrupulous material examination. This more thorough examination may account for the enhanced information acquisition obtained with the complex material.

One conclusion generated from this study is that research on the generic characteristics of instructional materials should be considered in conjunction with the more commonly conducted materials' evaluation studies. A teacher's evaluation of an instructional material or a teacher's effectiveness in utilizing a particular material is clearly affected, at least to some degree, by his familiarity with its delineated

objectives, recommended procedures, and his knowledge of its contents. It has been demonstrated in this study that at least one general characteristic of educational resources, material complexity, will differentially determine the amount of pertinent information gleaned during a period of material inspection. Thus, design features of instructional materials must be considered significant in determining the ultimate effectiveness of an instructional material.

This study also bears implications for materials development. In creating and making recommendations for new materials we must recognize the potential importance of structural characteristics in determining material effectiveness. In addition to level of material complexity, we may delineate other variables which interact with teacher utilization of instructional materials to determine their efficient implementation.

Finally, the authors recognize the need for caution and, in fact, urge conservatism in drawing conclusions from these data. A question of external validity (Campbell & Stanley, 1963) admittedly maintains in reference to the generalizability of these findings from a population of teachers-in-training to a population of experienced teachers. This consideration recommends replication of this study and implementation of similar investigations in the field setting.

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Footnotes

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[2]The authors express their appreciation to Mrs. Linda Smith for her assistance in material selection.

[3]Questionnaires are available upon request from the author.

Table I

Summary of Analysis of Variance on Comprehension Data

by Manual Design and Material Complexity

Source	SS	df	MS	F
Between Ss				
Manual Design (A)	.409	1	.409	2.11
Error	9.704	50	.194	
Within Ss				
Material Complexity (B)	.919	1	.919	20.42*
A x B	.065	1	.065	1.44
Error	2.246	50	.045	

*p < .01